

### **REMARKS**

In the Notice of Panel Decision from Pre-Appeal Brief Review mailed June 27, 2007, and further clarified in the Examiner-Initiated Interview Summary mailed on the same day, Claims 1-5, and 9-17 were pending for consideration. Previously, Claims 6-8, and 18-20 were canceled, and Claims 21-30 were withdrawn from consideration. Presently, Claim 1 has been amended, and Claim 11 has been canceled. All of the pending claims, Claims 1-5, 9-10, and 12-17, have been rejected under 35 U.S.C. 103(a) as allegedly obvious over WO 02/09909.

By the present amendment, Claim 1 has been amended to include the limitations of originally filed Claim 11, and part of the limitations recited in originally filed Claim 12. Specifically, the claim now requires a substrate attached to the mass of sintered nanodiamond particles including a layer of at least micron-sized diamond particles bonded together by a metal binder. The claim also requires a nanodiamond article wherein progression of the metal binder into the mass of sintered nanodiamond particles is prevented by low porosity of the mass of sintered nanodiamond particles. Support for the amendments to Claim 1 may be found in the originally filed Claims 11-12, FIGs 1A-1B, as well as in the originally filed specification in the following locations: pg. 10, line 15 – pg. 11, line 30. Accordingly, Applicant respectfully submits that no new matter is added by this amendment. Furthermore, such amendments are made without conceding the correctness of the present rejections, and without prejudice to Applicants' right to pursue relinquished subject matter in a future patent application.

Before discussing the obviousness rejections herein, it is thought proper to briefly state what is required to sustain such a rejection. The issue under § 103 is whether the PTO has stated a case of

*prima facie* obviousness. According to the MPEP § 2142, the Examiner has the burden and must establish a case of *prima facie* obviousness by showing the prior art reference, or references combined, teach or suggest all the claim limitations in the instant application. The Applicant respectfully asserts the Examiner has not satisfied the requirement for establishing a case of *prima facie* obviousness.

With the above background in mind, the rejection based on § 103 will be discussed. Applicant contends that the PTO has failed to make a *prima facie* case of obviousness in that WO 02/09909 fails to teach or suggest all of the claim limitations. Specifically, WO 02/09909 fails to teach a substrate attached to the mass of sintered nanodiamond particles including a layer of at least micron-sized diamond particles bonded together by a metal binder, such that progression of the metal binder into the mass of sintered nanodiamond particles is prevented by low porosity of the mass of sintered nanodiamond particles.

WO 02/09909 teaches an abrasive product that comprises a polycrystalline mass of self-bonded abrasive particles of irregular shape. In one embodiment, the abrasive particles can be diamond. In discussing diamond, the reference notes that the maximum particle size is typically 60 microns, preferably 50 microns. In the same sentence, the reference notes a "...lower limit of particle size of 0.1 microns." pg. 8, ln. 26-30. The reference teaches that self-bonding is a result of the asperities, sharp points, or edges of irregularly-shaped particles bearing upon a substantially flat area of an adjacent crystal, which results in plastic deformation at the contact points. pg. 3, ln. 5-11; and pg. 7, ln. 4-16. Naturally, the resulting product will have a porosity of at least 5 percent, and preferably greater than 10 percent. pg. 5, ln. 11-13. WO 02/09909 teaches

that it is necessary to use irregularly shaped particles, which produce interfaces prior to bonding, of edge or point to flat area. Such arrangement naturally produces a greater porosity in a final product than if the particles were tightly packed, i.e. flat surface to flat surface and bonded at that surface interface.

WO 02/09909 does not teach using particles of different sizes, it clearly does not teach using micron-sized diamond particles and nanodiamond particles. The reference does not teach nanodiamond particles with an average diameter of from about 2 nm to about 30 nm, as discussed thoroughly in previous responses, such arguments hereby incorporated. Nor does it teach arranging the different sized-particles as in Claim 1: a substrate including a layer of at least micron-sized diamond particles attached to a mass of sintered nanodiamond particles. As the reference does not teach utilizing two differently sized particles, it inherently cannot teach one set of the particles, i.e. micron-sized, bonded together by a metal binder, and the second set of particles, i.e. nanodiamond, sintered with less than about 2% by volume of materials other than nano-diamond or non-diamond carbon.

Furthermore, even if, *arguendo*, WO 02/09909, taught (a) two sized particles, (b) nanodiamond particles, (c) micron sized diamond particles in addition to nanodiamond particles, (d) a layer of micron-sized diamond particles included in a substrate, (e) the substrate attached to sintered nanodiamond particles, and (f) the micron-sized diamond particles bonded together by a metal binder, all elements of which are not taught by WO 02/09909, the porosity of WO 02/09909, as necessary for self-sintering, would not be low enough, as claimed, to prevent progression of metal binder from the substrate into the mass of sintered nanodiamond particles as

presently claimed. As noted, WO 02/09909 requires a higher porosity of self-bonded articles due to the required irregularly-shaped particles, and the mechanism of bonding. Therefore, the reference can not be modified to the presently-claimed invention.

Furthermore, not only does the cited WO 02/09909 reference fail to teach all of the required elements, but nothing else provided or cited by the Examiner teaches or suggests such elements. Therefore, the Examiner has failed to present a *prima facie* case of obviousness.

In light of the above comments, Applicant respectfully submits that WO 02/09909 fails to teach or suggest each of the elements of the claimed invention. Further, the reference teaches away from modification to the presently claimed invention. As such, a *prima facie* case necessary to support a §103 rejection was not established in the Office Action. Accordingly, Applicant respectfully requests that the above rejection be withdrawn.

**CONCLUSION**

In view of the foregoing, Applicant believes that presently pending Claims 1-5, 9-10, and 12-17 present allowable subject matter and allowance is respectfully requested. If any impediment to the allowance of these claims remains after consideration of the above remarks, and such impediment could be resolved during a telephone interview, the Examiner is invited to telephone the undersigned attorney at (801) 566-6633, to address such issues as expeditiously as possible.

The Commissioner is hereby authorized to charge any additional fee or to credit any overpayment in connection with this Amendment to Deposit Account No. 20-0100.

Dated this 20<sup>th</sup> day of September, 2007.

Respectfully submitted,

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